

## Tropical Areas of Interest Discussion for August 21, 2010

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### **Summary:**

Today is once again a no-fly day at FLL for the GRIP field program, but issues with the DC-8 have come to light and there will not be any flights until the DC-8 can be thoroughly inspected, so no-fly days will persist through Tuesday at the earliest. This is not necessarily the worst time for this to happen however, since both the Global Hawk and the DC-8 instrumentation are in need of some work, and there are currently no flight targets anywhere near the GRIP flight domain for either aircraft. The tropics are growing more interesting though, as the intensity and track forecast for AL95/PGI-31L are showing intensification of the system is expected slowly over the next few days, before the system will start to recurve somewhere between 50W and 60W, depending on what model is used. Tropical storm strength is possible in the next day or so, according to the majority of the models. Other features of interest to the various programs include PGI-30L (which PREDICT has been flying), a persistent upper level low, a potential Gulf of Mexico system that could break off a cold front heading steadily southeastward across the US by Monday morning, the dry air outbreak, and another impressive dust event that will be exiting Africa early next week as well.

### **Forecast for 1600 UTC 8/21/2010:**

#### **Synoptic Overview:**

There are two upper level lows in the western half of the Atlantic Basin; one over the Yucatan Peninsula and another over the Bahamas (**3A, 3B**). These two lows interact over Cuba and continue to be suppressing convection in the central Caribbean and Gulf of Mexico today (**2A**), as well as dry air over the central Caribbean at low to mid levels, as seen in TPW imagery (**4**). The tropical wave in the western GOM near 20N/96W is moving onshore in Mexico and PGI-27L, which was associated with it, has dissipated. The subtropical high is strong across the mid-latitude central Atlantic. Weakening of this ridge over the next few days could impact the track of PGI-31L/AL95. The cold low to the north of Puerto Rico is wrapping dry air around it today, but less convection is associated with it to the southwest of the center today (**2A, 2B**) compared to yesterday. Dry air wrapping around this system over the last 24 hours has clearly impacted this system. This low will slowly track to the west-northwest and may interact in a few days with an emerging cold front leaving the US. Good low level vorticity is not seen much until the Eastern Atlantic (**3C**) in association with the most recently emerged waves and PGI-31L (**6**). The waves analyzed in between there are very dry and devoid of deep convection (**1, 2A, 2B**). These waves are present along 68W extending north out of the ITCZ from 12N to 23N, and from 11N/45W to 24N/46W. PGI-30L is near 20N/50W and has slightly better leading-edge convection today than yesterday, however the system is dominated at upper and mid levels by dry air and is only accompanied by good TPW at low levels.

West Africa and the East Atlantic are really beginning to set up in a classic pattern under the influences of a monsoon trough regime with many exiting waves in deep layer moisture, and an

upcoming SAL outbreak in northwest Africa (**8, 9**). There is a big ridge set up over Africa noticeable in the deep layer steering. This ridge set up over the last day is showing that for the first day there is E-W zonal flow, and for the next few days, the flow should be more conducive for development. Far inland over Africa, there is the system that some models are trying to develop next week (PGI-34L). PGI-33L is wrapping into PGI-31L today, and these two systems are both high in low-level vorticity and high precipitable water (**4, 6, 7**). This combined systems is being dominated by easterlies steering these systems on a due-westward track for the near future. PGI-31L/AL95 is beginning to better organize, and will likely develop into a tropical storm within the next 2 days (**11, 12, 13**).

### **Features of Interest:**

#### **Upper-Level Low**

An elongated upper-level low currently extends from 25N/75W to 20N/90W the PV values on the 340 K isentropic surface have decreased over the past 48 hr from 2.5 PVU to 1.5 PVU as the upper-level low has moved westward from 20N/60W. The destruction of PV at upper-levels was associated with the scattered deep convection triggered by the upper-level low (**3A, 3B**). The upper-level low is forecast to remain fairly stationary over the next 72 hr perhaps slowly migrating northwards until it interacts and is possibly picked up or merges with the trough currently located over the central United States at 94W. The upper-level low may make some small contribution to the development of the cyclone off of the US coast at 72 -120 hr (**5**).

#### **Possible Cold Front Development**

A cold front currently extends from the Great Lakes SW towards the TX panhandle and is associated with an upper-level trough over the northern US and southern Canada at 94W. In addition a stationary front is currently extended over the central Atlantic from 40N/40W to 30N/70W (**1**). In the 0600 UTC GFS the trough is forecast to deepen and become elongated as the ridge to the west of it is amplified by a very intense upper-level trough currently off the US West Coast. By 8/23 12 Z the trough currently over the central US will be approaching the coast and of fairly high amplitude. By 0600 UTC 8/23 a low is moving off of the US coast near New Jersey with a cold front and precipitation extending toward Louisiana.

There is currently convection in the far NE Gulf and off the coast of Florida associated with the remnant front interacting with an upper-level low (**2, 3A**). The upper-level low should continue to serve as a focal point for convection with convection enhanced on the western side of the upper-level low. The front then gets left behind with precip. and possibly a remnant low off/near the coast of Louisiana remaining through Tuesday. In addition to the remnant low, precipitation will be located off the coast of the Carolinas on Monday and Tuesday. There is still uncertainty in the degree of southward penetration of the cold front and the intensity and position of any low developing on the tail end of the front. The 0000 UTC ECMWF has an 850 hPa vorticity maximum breaking off on 8/25 and moving toward the western Gulf by 8/26 and staying there. The 1200 UTC WRF has the cold front propagating considerably farther south than the 0600 UTC GFS. In the WRF the front nearly reaches Cuba giving a better chance for low development. This is all tied to the overall uncertainty in the shape of the high amplitude trough forecast to develop off the US coast as the 1200 UTC WRF is predicting a slightly deeper trough off the East Coast on Monday.

**PGI-27L:**

An upper level ridge covers most of the Gulf of Mexico with water vapor imagery shows an upper/mid level dry airmass moving across the basin creating more stable conditions for most of the area (2B). The tropical wave over the SW Gulf of Mexico extending from 23N96W to 13N92W is moving W/NW at 5-10kt (1). The current central location of PGI-27 associated with this wave has been analyzed to be 20.2N, 97.6W at 12z. Convection is disorganized and very little low-level cyclonic flow seen in the visible and IR satellite imagery (2A). Low level moisture is present along with low-level convergence which is generating scattered moderate convection still located over much of the southern Bay of Campeche and S of 23N and W of 92W. The models agree with an elongated maximum of 850mb vorticity associated with the subdued convection extending along the Mexico coast from near 23N 98W and extending SE towards the Yucatan as the weakening wave continues to move inland (3C). The steering winds are continuing to push this wave WNW as it passes along the ridge in the Gulf (2D). Since the wave has made landfall, is disorganized, and has lost access to water, no development is expected.

**Dust/SAL:**

As of 1200 UTC on 8/21, a pocket of dusty air was located to the south of the island of Hispanola near 72W/18N. The MODIS instrument on board Terra measured AOT values greater than 0.85. A good portion of the central Caribbean from 70W to 80W and between 13N and 20N was also under high AOT (See TERRA AOT for 8/21 at 0000 UTC, 8). This area has continued to move westward as the leftover from a SAL outbreak which moved off the coast of Africa nearly 10 days ago. Elsewhere in the Atlantic, a surge of low level moisture is following PGI-30L above 20N. To the west of this, and in the eastern Caribbean are anomalously low values of total precipitable water. In the far eastern Atlantic, a surge in northeasterlies is bringing dry mid-latitude air below 20N. (See MIMIC TPW product for 1200 UTC on 8/21, 4) GEOS-5 is forecasting a new SAL outbreak leaving the African west coast on 8/23. (See GEOS-5 forecast for Dust AOT valid on 8/23 at 0000 UTC, 9) This is related to easterly wave activity seen in the model 700 hPa vorticity field. The vorticity behavior seen in GEOS-5 matches the 700 hPa vorticity in GFS and ECMWF, suggesting an agreement between the global models in the easterly wave dynamics which may force the SAL outbreak.

**PGI-30L:**

On 8/21 at 1200 UTC, PGI-30L was located at 47W/19N (6). The feature still closely resembles an open easterly wave with broad cyclonic turning of the wind field at low levels. There was a single convective feature evident in SWIR GOES imagery located approximately 400 km from the analyzed center of the pouch. (See CIMSS multi-product with track, SWIR and low-level cloud track winds, 10) While TPW values in the system are higher than 55 mm, the mid and upper levels are very dry. An AIRS sounding near the center of the wave axis shows a dew point depression of greater than 10 degrees C. As of the 0000 UTC global model initializations, pouch tracking was not encouraging for future TC development from this system. GFS and UKMET are not able to track a 925 hPa pouch beyond 60 hrs, and the ECMWF loses the 925 hPa pouch after 24 hours. The consensus from the models takes the track westward just to the north of the Windward Islands after 36 hours. The NCEP ensemble forecasts that the low level moisture currently present in this system will erode over the next 48 hours. The models suggest that convection will continue to remain minimal in PGI-30L, without mid-level moisture

and a low-level moisture supply which is quickly eroding. Currently the only positive feature this system has is a well-defined low level wave. Although TC formation is not expected in the next 48 hours, it should be monitored as an easterly wave until it moves out of the GRIP domain.

### **AL95/PGI-31L**

The system is centered near 30W/12N at 0900UTC (1). The IR satellite imagery (7) is indicating rotating convection in a similar location as the vorticity maximum (2A, 3C). While deep convection has mostly been east-west oriented (ITCZ), there is some convection pushing northward associated with the apparently developing circulation. Additionally, there was convective initiation overnight west of the disturbance near 45W, which seems to be associated with another 850hPa vorticity maximum. The wind shear is fairly high over the disturbance ~20 kt, which may be associated with stronger low-level winds; this may be acting as a bit of a hindrance to development, although a tropical depression is expected in the next 48 hours. As a comparison, for the forecast valid 25 Aug. 1200UTC: 0000UTC run was located at 50W/20N with 996hPa contour, while the 1200UTC is 51/21W with 996hPa contour. The initial location today was close to what was forecasted yesterday. The following is the MSLP forecast from the GFS initialized at 0600UTC (10) (this will be different than yesterday which was the 850 hPa VM forecast; however, the MSLP should more or less be near the 850 hPa vorticity).

21/1800UTC: 30W/13N; 22/0000UTC: 31W/13N; 22/0600UTC: 33W/13N;  
22/1200UTC: 34W/13.5N; 22/1800UTC: 35W/14N; 23/0000UTC: 36W/14N;  
23/0600UTC: 38W/14N; 23/1200UTC: 39W/15N; 23/1800UTC: 41W/15N;  
24/0000UTC: 42W/16N; 24/0600UTC: 44W/16N; 24/1200UTC: 46W/17N;  
24/1800UTC: 47W/17N; 25/0000UTC: 49W/18N; 25/0600UTC: 50W/19N;  
25/1200UTC: 52W/21N; 25/1800UTC: 53W/22N; 26/0000UTC: 53W/24N;  
26/0600UTC: 54W/25N; 26/1200UTC: 55W/26N; 26/1800UTC: 56W/26N;  
27/0000UTC: 55W/27N; 27/0600UTC: 55W/28N; 27/1200UTC: 55W/29N;  
27/1800UTC: 55W/30N; 28/0000UTC: 54W/31N; 28/0600UTC: 53W/33N

The 0000UTC ECMWF forecast for MSLP (13): 22/0000UTC: 28W/13N; 23/0000UTC: 33W/15N; 24/0000UTC: 43W/16N; 25/0000UTC: 47W/20N; 26/0000UTC: 48W/23N; 27/0000UTC: 48W/28N; 28/0000UTC: 48W/28N.

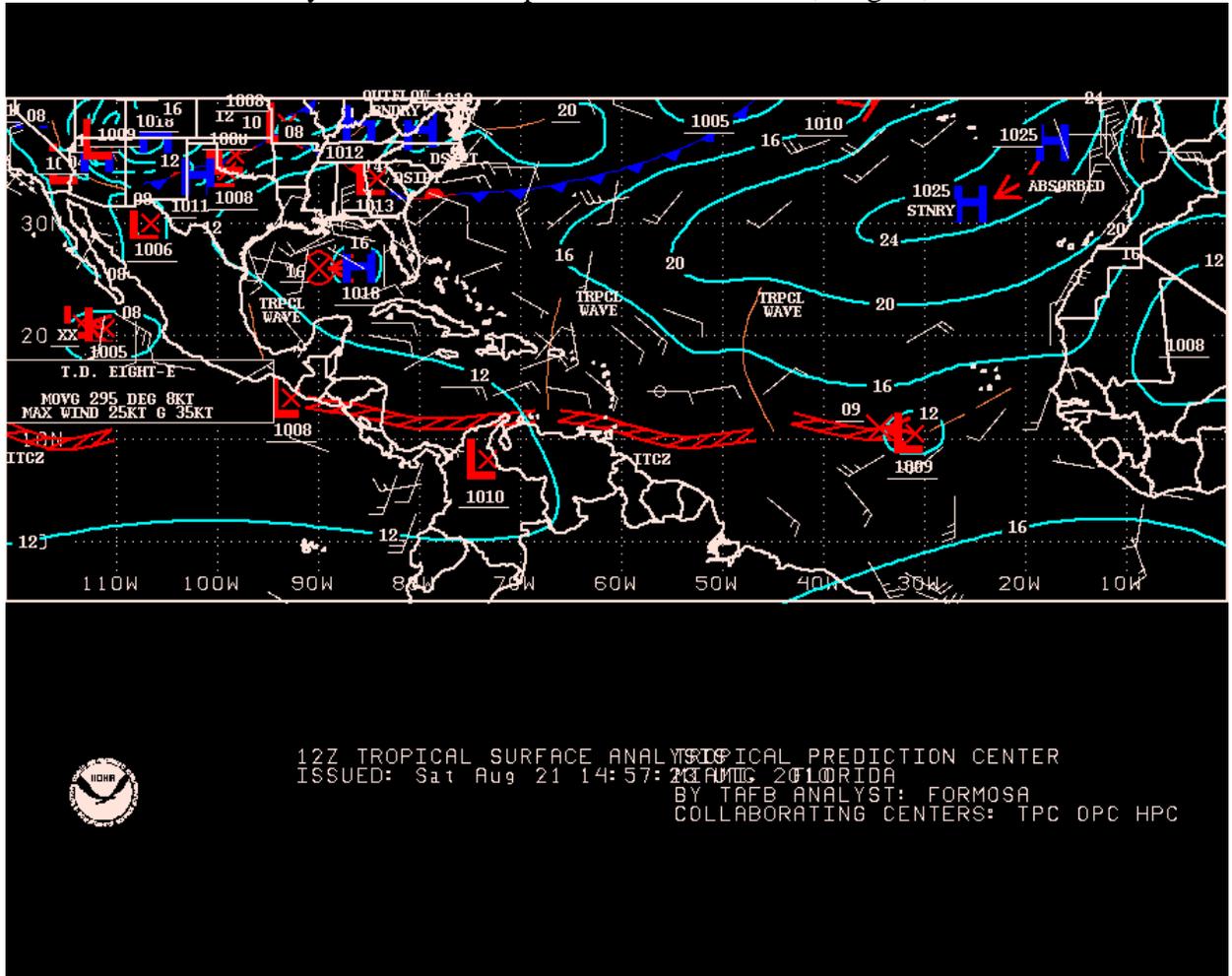
The ECMWF has a different solution in that it does not develop as aggressively as GFS. The disturbance does not go as far west and 'develops' farther east. The CMC has a similar track as GFS, but develops a storm of smaller-scale (10, 13). NOGAPS has the disturbance much farther east and also not as aggressive. HWRf develops a CAT1 hurricane sooner (12), but the track is more northward and re-curves sooner.

The consensus forecast location for the pouch for today's initialization is as follows:

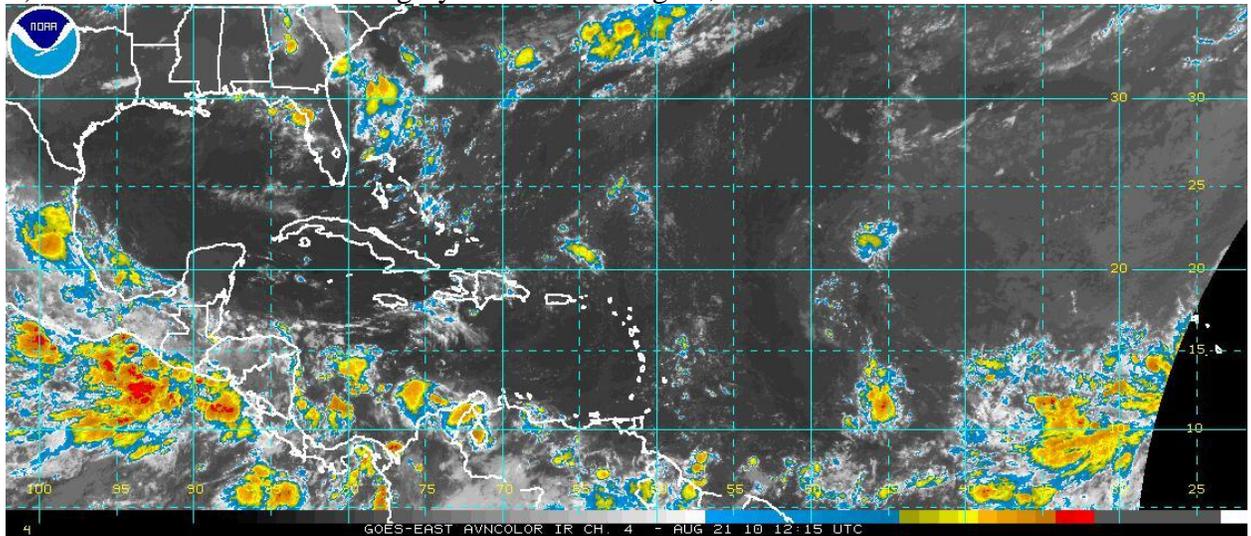
22/0200UTC: 29.5W/13.6N; 22/1400UTC: 32.7W/16.2N; 24/0200UTC: 42.3W/17.6N;  
24/1400UTC: 45.2W/19.1N; 25/0200UTC: 47.3W/21.1N; 25/1400UTC: 48.9W/23.1N.

## **Static Images used in discussion:**

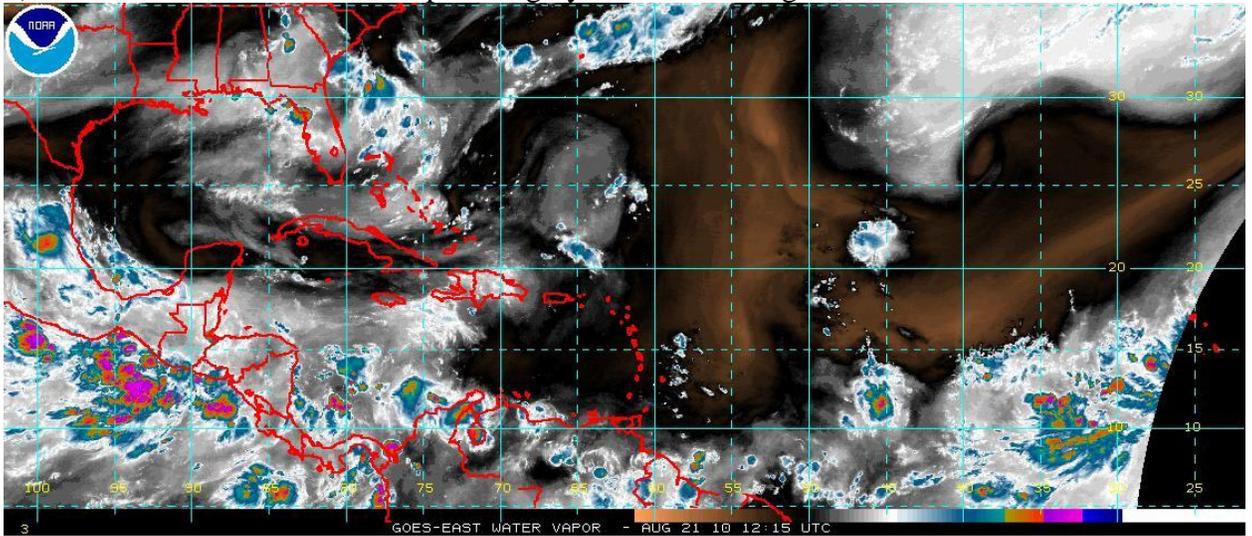
1) 1200 UTC Surface Analysis from the Tropical Prediction Center, Aug 21, 2010:



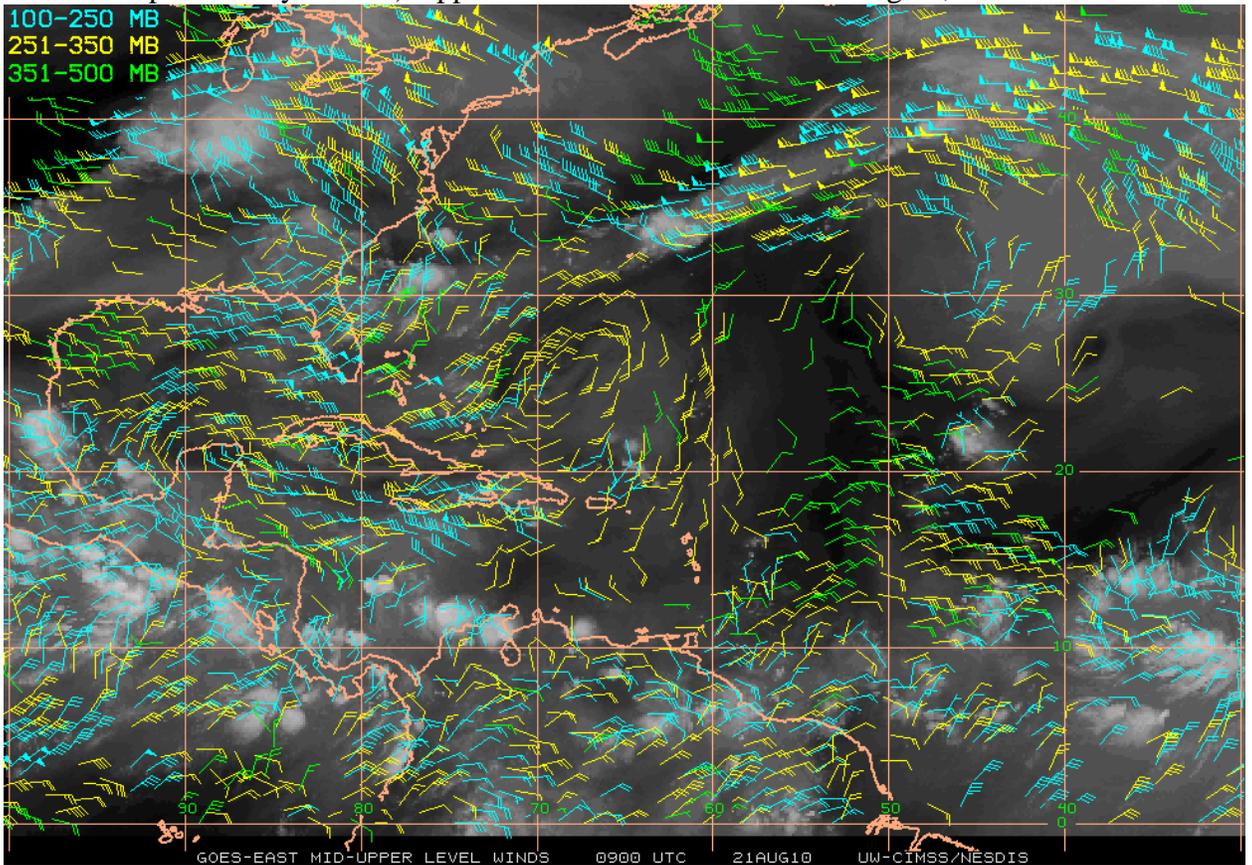
2) A) Atlantic Wide View IR Imagery 12:15 UTC Aug 21, 2010:



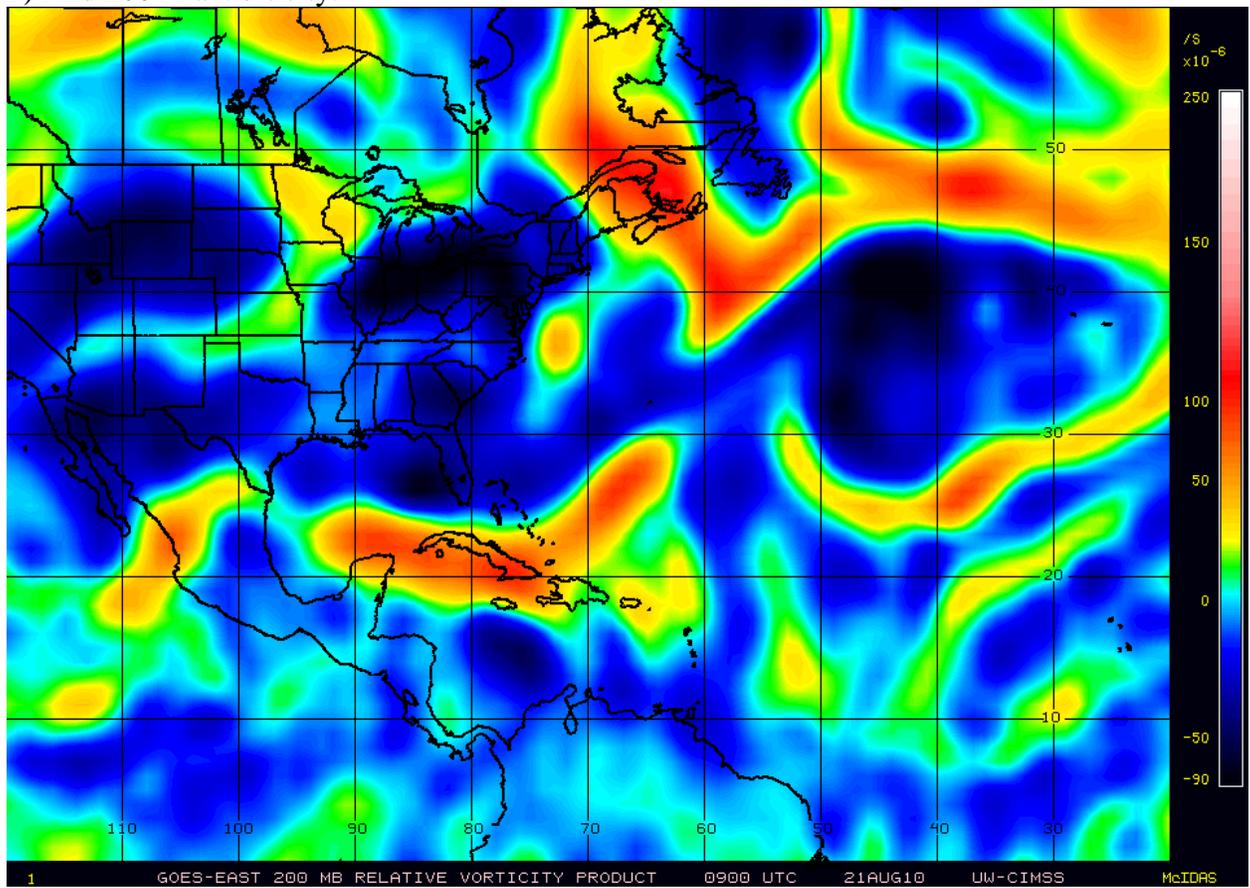
B) Atlantic Wide View Water Vapor Imagery 12:15 UTC Aug 21, 2010:



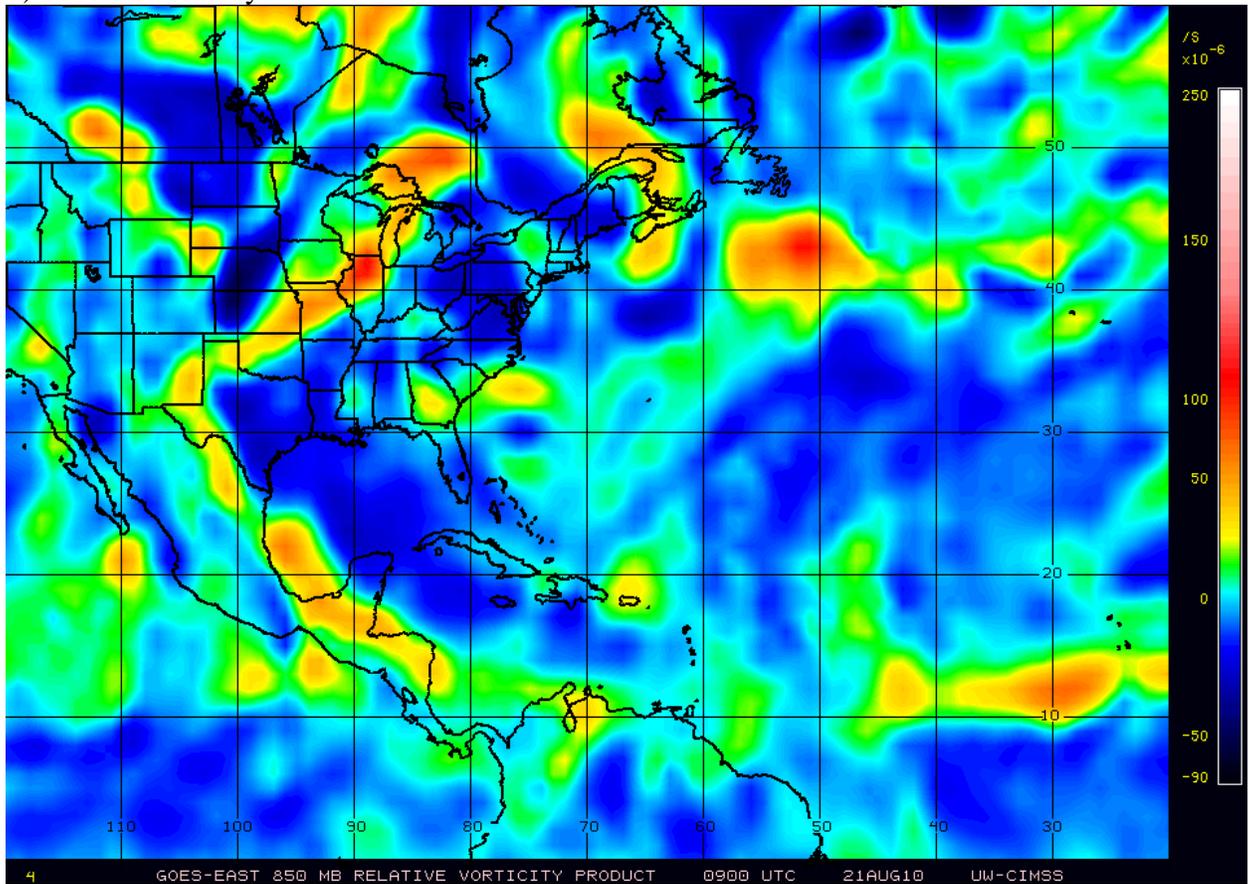
3) CIMSS Tropical Analysis of A) Upper Level Winds at 0900 UTC Aug 21, 2010:



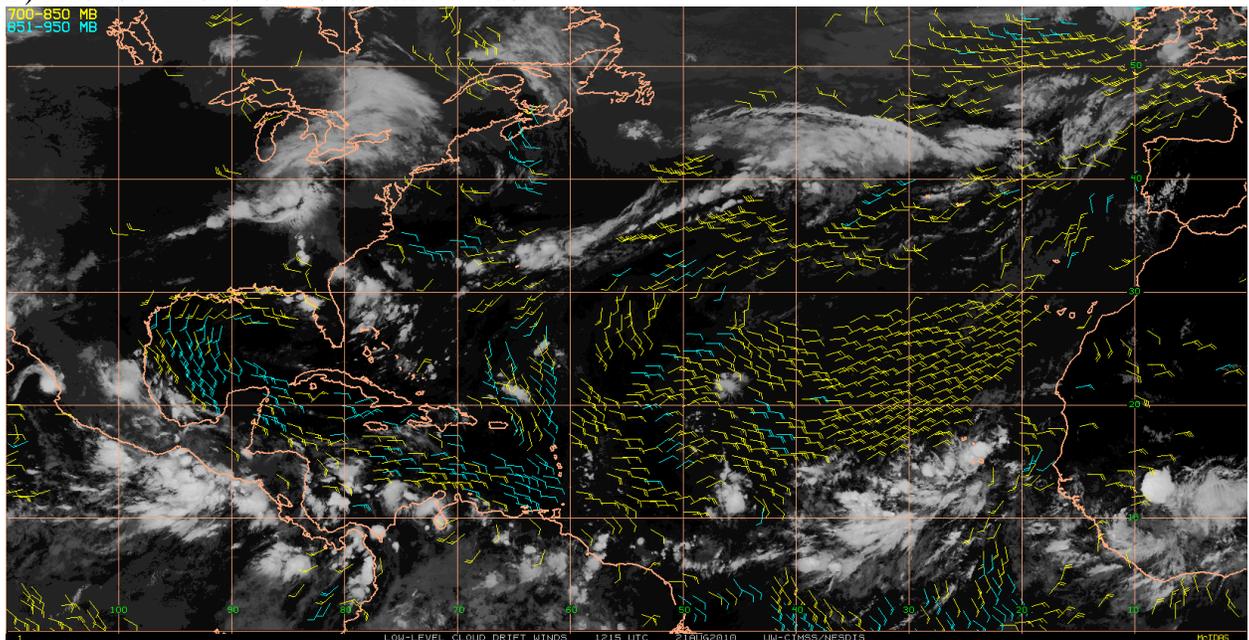
B) And 200 hPa Vorticity:



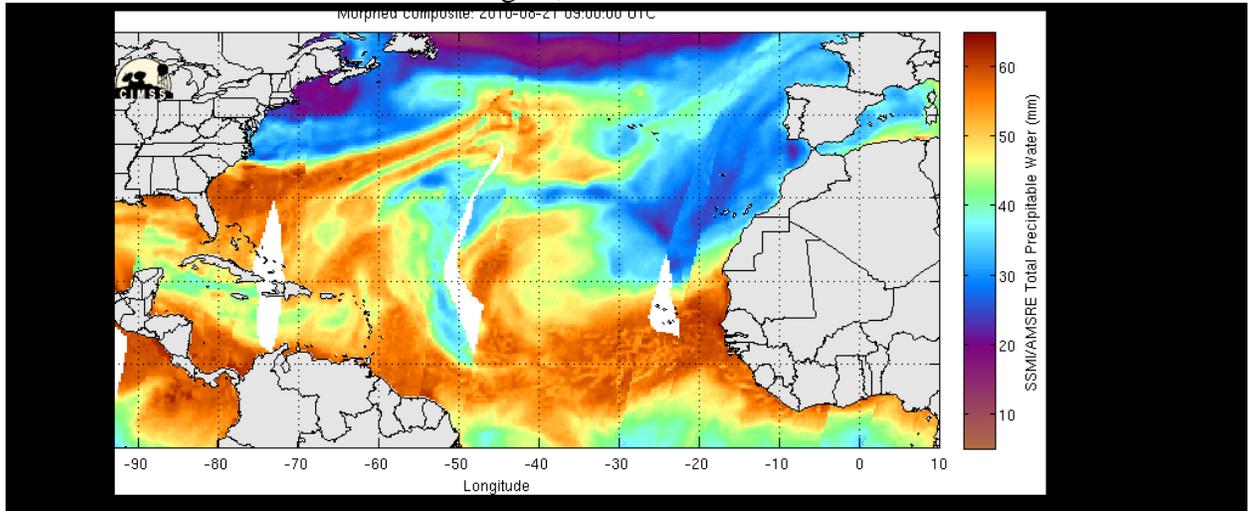
C) 850 hPa vorticity:



D) And low-mid level cloud-track winds:

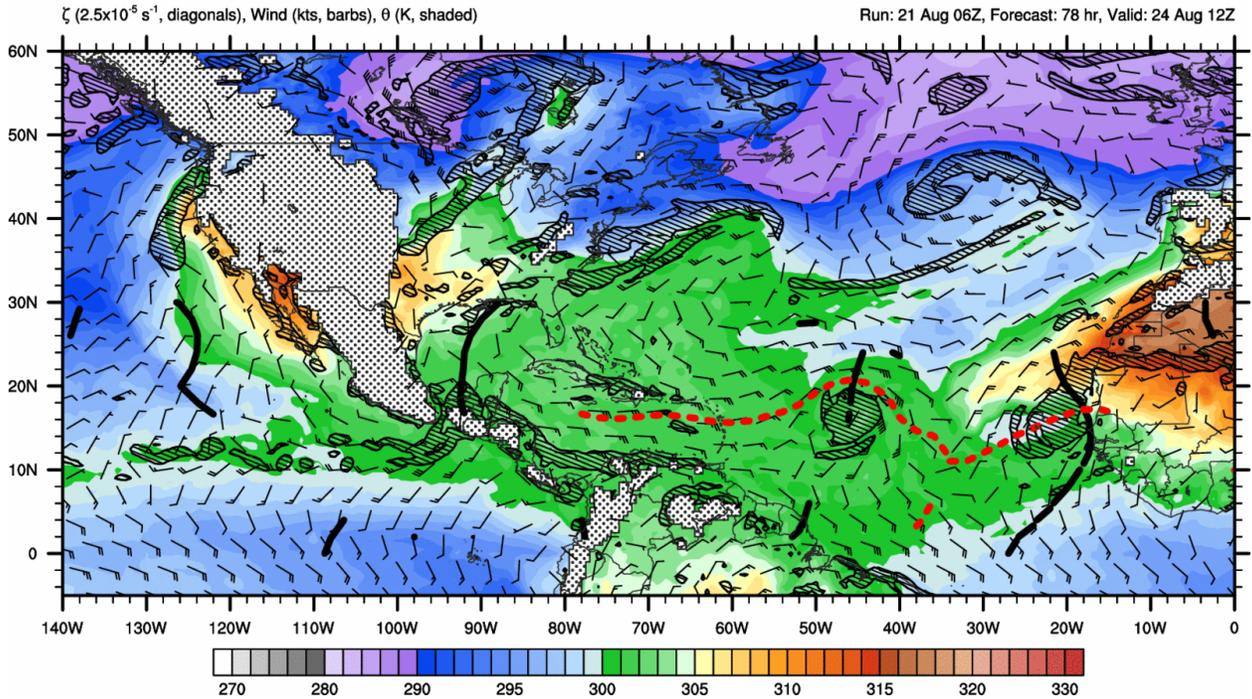


4) CIMSS/MIMIC TPW at 0900 UTC Aug 21, 2010:

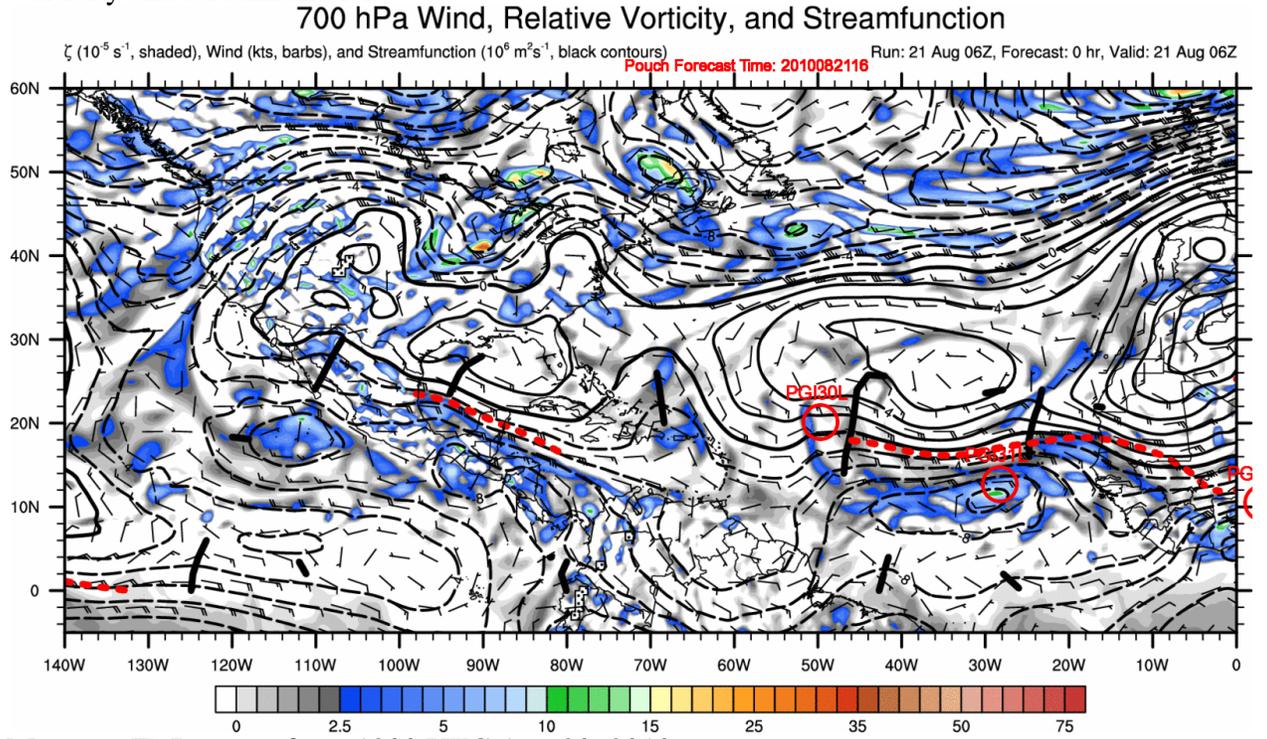


5) 925 hPa Wind, Relative Vorticity, and Potential Temperature forecast initialized 0600 UTC Aug 21 for 78-hours (at 1200 UTC Aug 24, 2010):

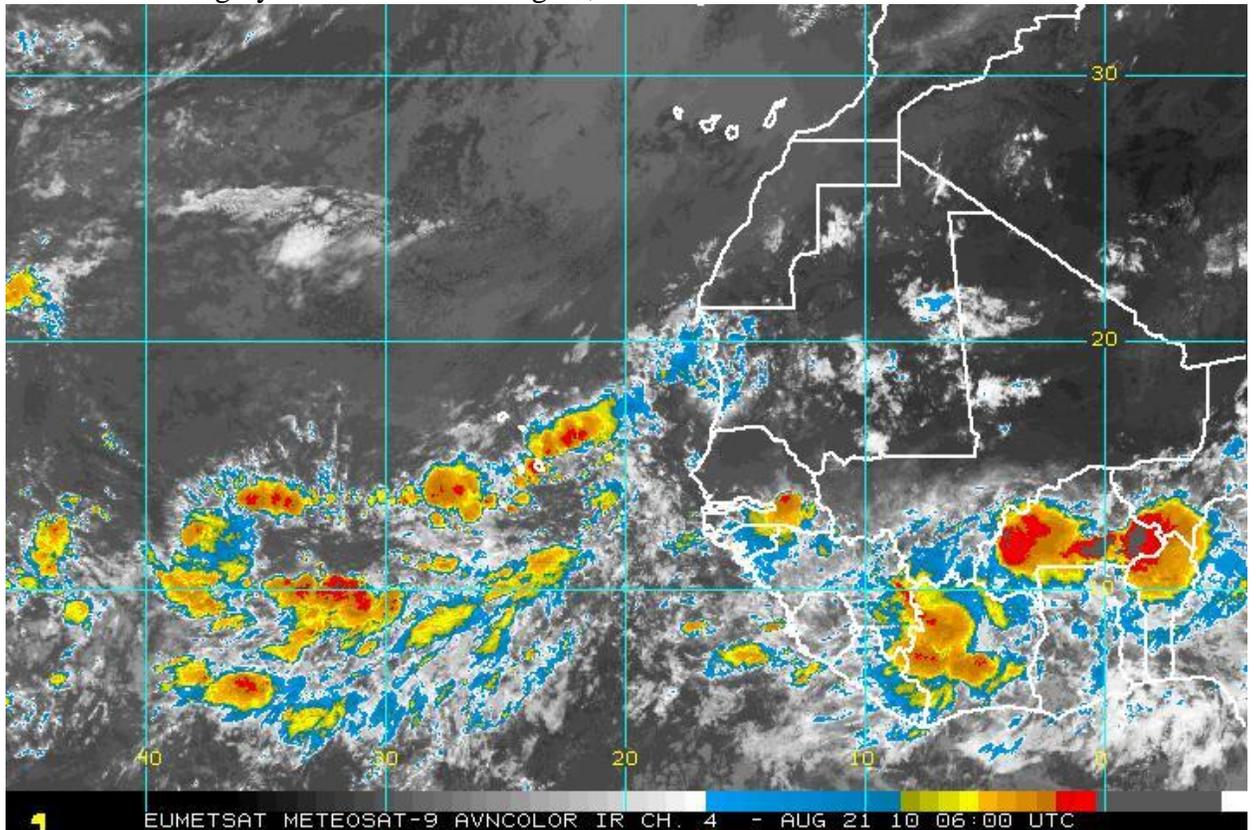
925 hPa Wind, Relative Vorticity, and Potential Temperature



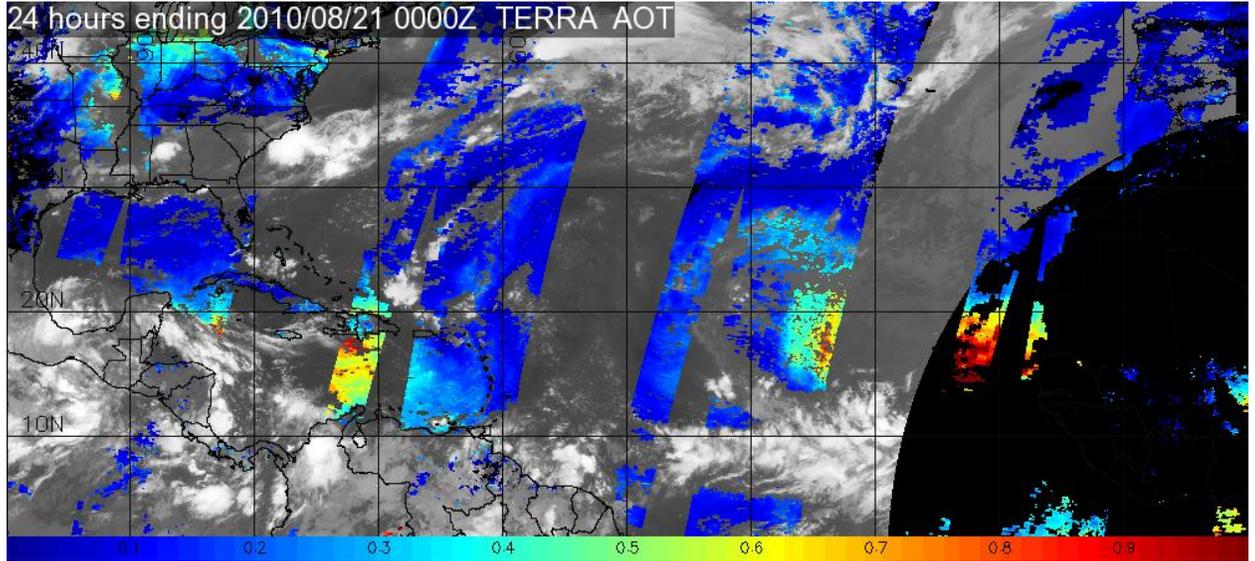
- 6) Pouches from Montgomery site for Aug 21, 2010 plotted on 700 hPa Winds, Relative Vorticity and Streamfunction:



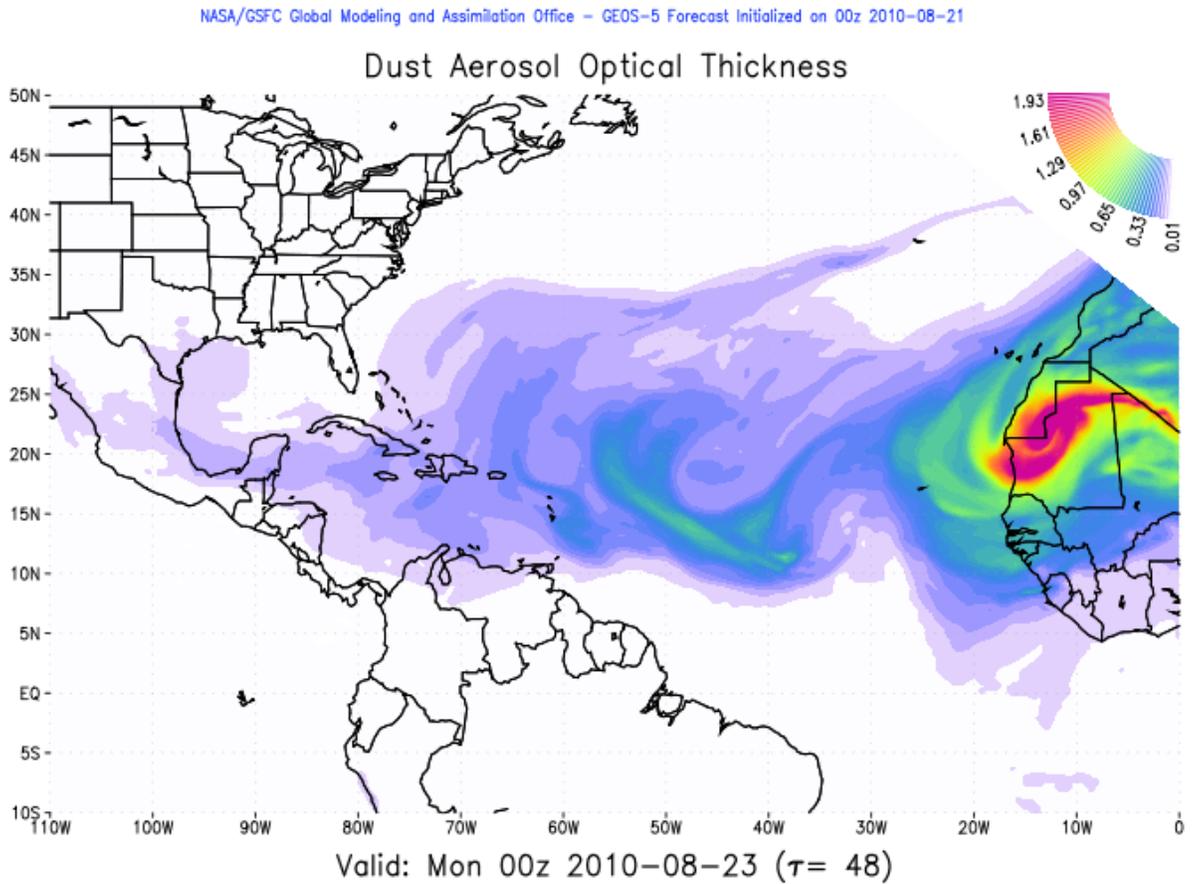
- 7) Meteosat IR Imagery from 1200 UTC Aug 20, 2010:



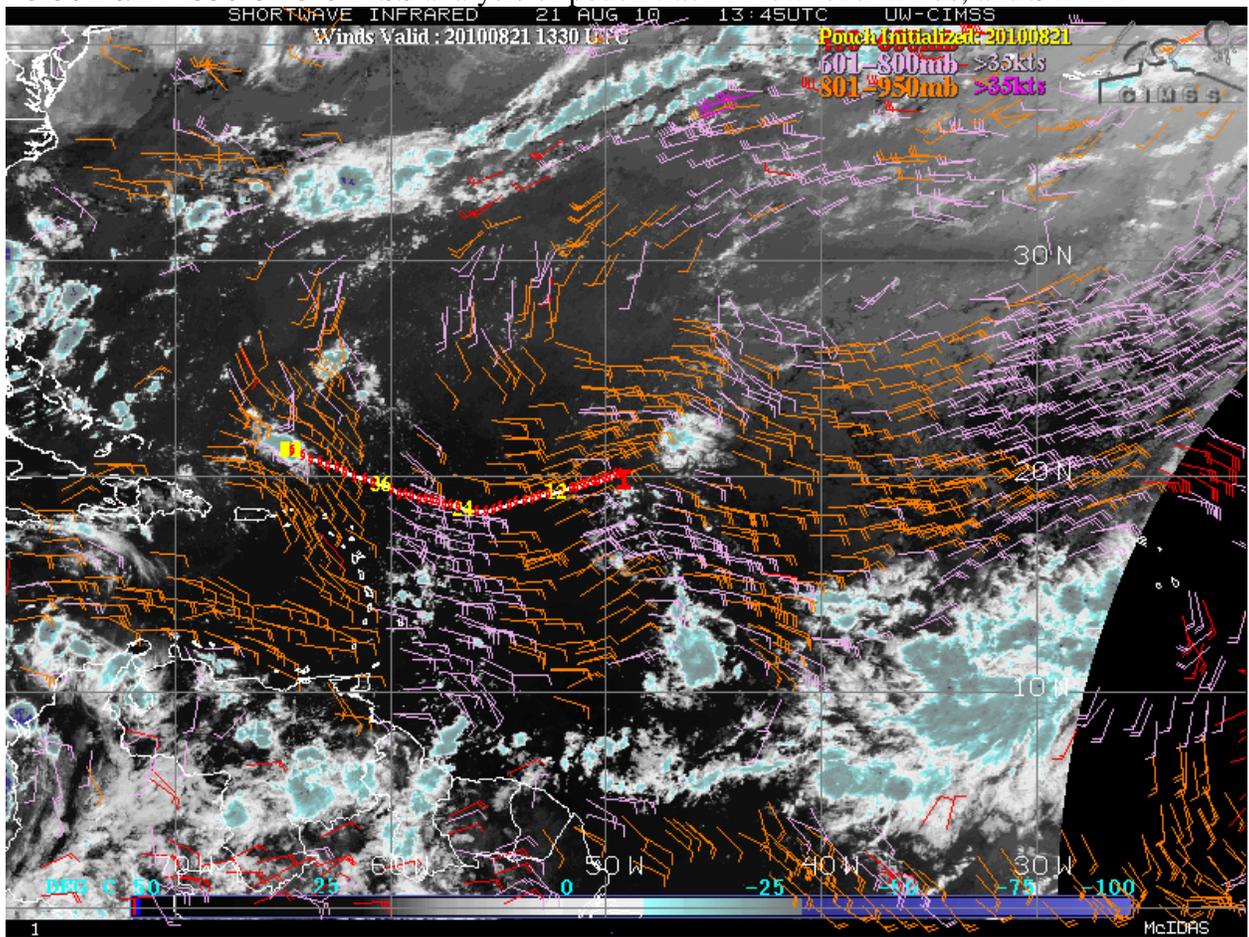
- 8) TERRA Aerosol Optical Thickness 24-hour composite plot from Aug 21, 2010 at 0000 UTC:



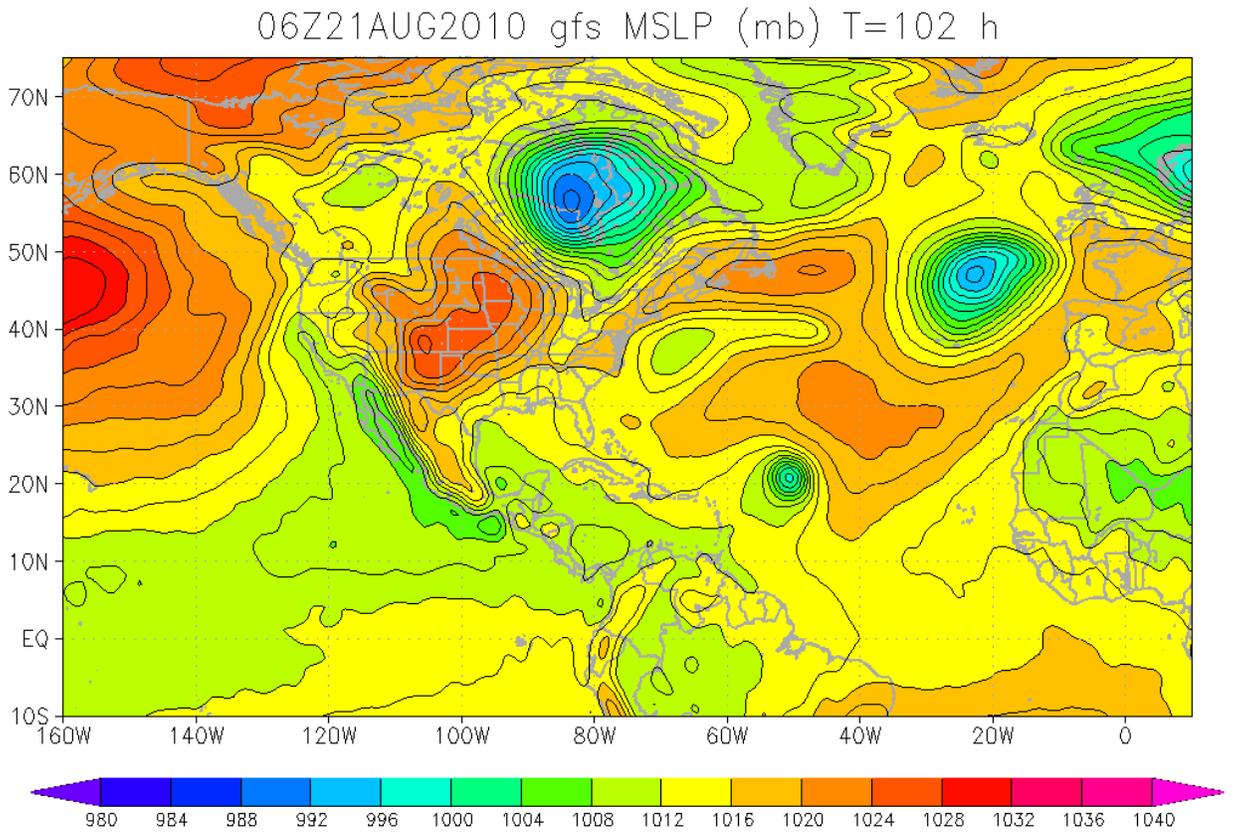
- 9) Dust Aerosol Optical Thickness 48-hr forecast from the GEOS-5 model run at 0000 UTC Aug 21, for 0000 UTC Aug 23 Dust Outbreak:



10) PGI30L 8/21 1330 UTC CIMSS analysis of pouch track in low level winds, and SW IR.



11) GFS Model run at 0600 UTC Aug 21, 2010: 102 hour forecast (time= 1200 UTC Aug 25, 2010) for sea level pressure.

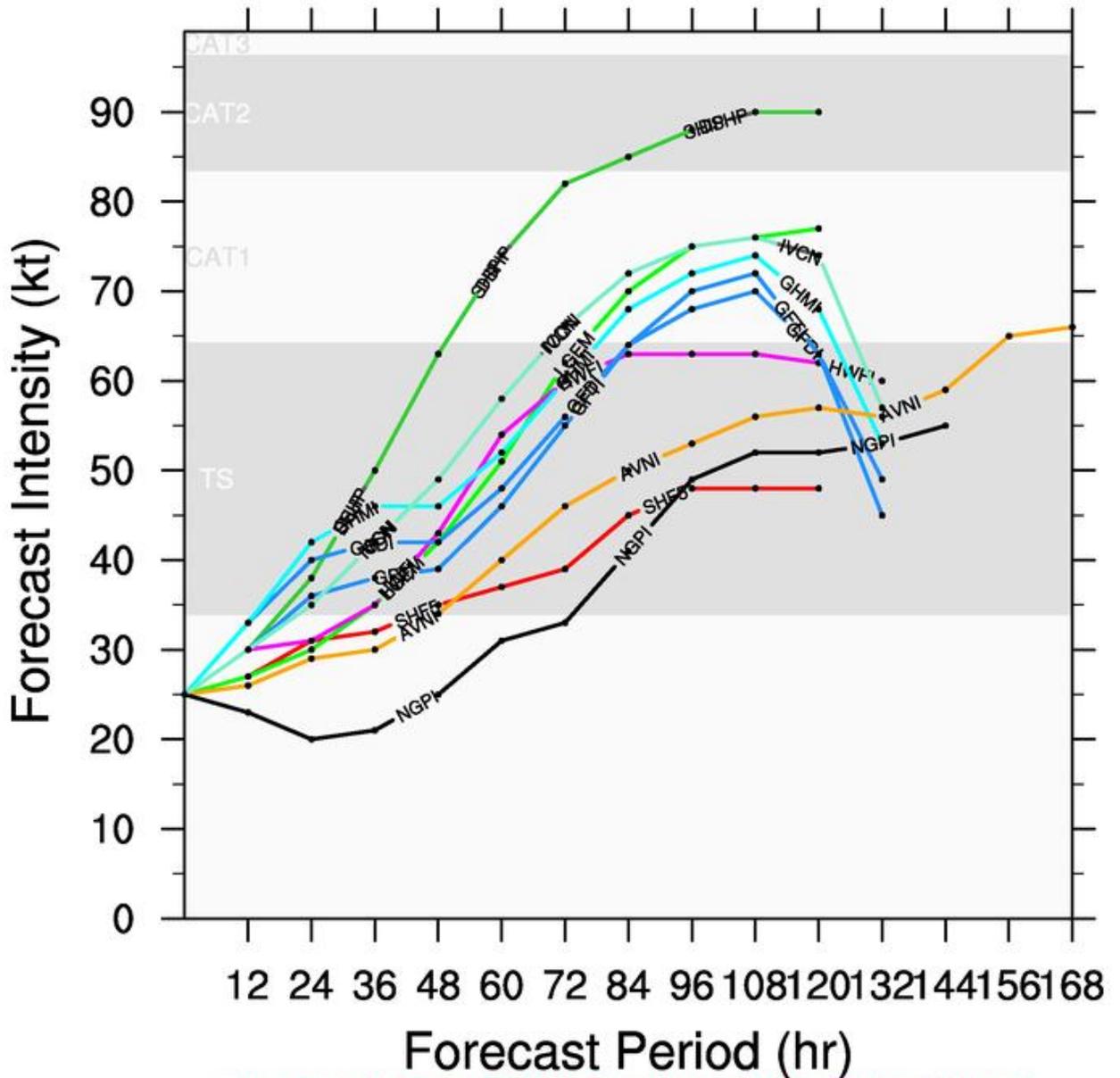


12) Intensity forecasts from the Early Cycle guidance for PGI-31L/AL95 from 0600 UTC Aug 21, 2010:

# DISTURBANCE INVEST (AL95)

## Early-cycle intensity guidance

valid 0600 UTC, 21 August 2010



This plot does not display official storm information. Use for information purposes only.  
DO NOT USE FOR LIFE AND DEATH DECISIONS!

13) ECMWF forecast for PGI-31L/AL95 pouch forecast initialized 0000 UTC Aug 21, 2010:  
 PGI31L: 5-Day Forecast Based on ecmwf  
 Initialized at 2010082100

